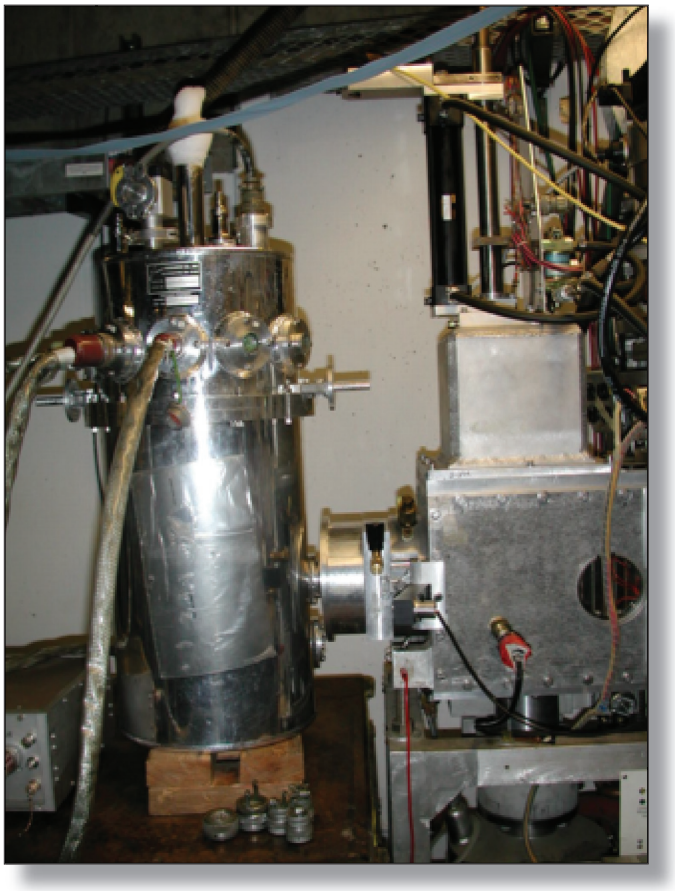
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Air Force SBIR/STTR Celebrating 100 Years of Air & Space Innovation

Success Story

AFRL PROVIDES KEY SCA CHARACTERIZATION CONCLUSIONS AND REVISED SCA SCREENING PROTOCOL FOR SBIRS HIGH PROGRAM



Assessing performance levels of sensor chip assemblies (SCAs) in the presence of ionizing radiation provides key information on SCA performance, pointing the way towards understanding failures observed in a significant percentage of SCA assets.

Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

The Space Vehicles Directorate's Infrared Radiation Effects Laboratory (IRREL) characterization facility conducted a characterization campaign to assess performance lavels of scanning SCAs in the presence of ionizing radiation. They extracted key information on SCA performance from the data sets for the Space-Based Infrared System (SBIRS) High program.

This increased level of understanding allows the development of a screening process wherein the "go/no go" decision on ionizing radiation survivability is determined in the laboratory without performing actual radiation testing. As a result of these efforts, the fabrication did not require additional lots of SCAs, thereby saving the directorate's systems program office the costs and schedule delays associated with such fabrication runs.

Background

The directorate constituted the IRREL in 1987 to address challenging issues of characterizing the performance of high sensitivity, lower (space) background focal plane arrays (FPAs) under development for the Strategic Defense Initiative Office (now the Missile Defense Agency). The IRREL characterization facility provides a broad range of capabilities, including operating temperatures (4 Kelvin and upwards), background levels (10^9 photons sec^{-1} cm^{-2} and higher), ionizing radiation environments (Cobalt-60 gammas, protons, neutrons, X-rays), and infrared (IR) wavelengths (visible to 30 microns), for all visible and IR FPA (detector array and cryogenic multiplexer) types.

The execution of the IRREL mission required reconfigurable cryogenic Dewars in a timely fashion to meet various electrical requirements of diverse SCAs and FPAs, and an FPA drive and data acquisition system with very low levels of system noise. Portability of the test system for use at remote radiation source locations and low levels of radioactivity after exposure were also key requirements. The personnel performing these tests have more than 90 years combined experience that is unrivaled anywhere in the Department of Defense.

Space Vehicles
Emerging Technologies

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-VS-11)